Supplemental Specification
2005 Standard Specification Book

SECTION 13551

GENERAL ATMS REQUIREMENTS

Delete Section 13551 and replace with the following:

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Materials and procedures for installing all ATMS components as defined in the contract.

B. Provide all documentation required for the installation and testing of ATMS components.

1.2 RELATED SECTIONS

A. Section 00725: Scope of Work

B. Section 01554: Traffic Control

C. Section 01721: Survey

D. Section 13591: Traffic Monitoring Detector Loop

E. Section 13595: ATMS Integration

1.3 REFERENCES

A. AASHTO M 232: Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware (nuts, washers, and anchor bolts)

B. AASHTO M 314: Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

C. AASHTO Roadside Design Guide (current edition)

D. AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (current edition)

E. ASTM D 3005, Type I or II. UL 510

F. American Wire Gauge (AWG)

G. International Building Code (IBC)

H. International Municipal Signal Association (IMSA)

I. Manual on Uniform Traffic Control Devices (MUTCD; current edition)

J. National Electrical Code (NEC)

K. National Electrical Safety Code (NESC)

L. Rural Electrical Association (REA) Bulletins

M. USDA Rural Utilities Service (RUS) Bulletin

N. Underwriters Laboratory (UL)

1.4 DEFINITIONS

A. ATMS - Advanced Traffic Management System

B. CCTV - Closed Circuit Television

C. RMS - Ramp Meter System

D. RWIS - Road Weather Information System

E. TMS - Traffic Monitoring Station

F. VMS - Variable Message Sign

G. WIM - Weigh In Motion

1.5 SUBMITTALS

A. Provide two copies of all documentation to the Engineer. Install one additional copy in a weatherproof sealable sleeve and place in each field cabinet.

B. The general purpose and content of all required submittals is described in Table 1. Refer to the appropriate specifications for details of the submittal requirements and test procedures for each ATMS device. Obtain UDOT's newest version of the test procedures for the local field operations test from the UDOT website. Refer to http://www.udot.utah.gov/index.php/m=c/tid=719.

Table 1
Submittal Requirements

Name	Timeline	Description
Contractor Furnished Material and Equipment Lists	Submit within 15 business days from Notice to Proceed.	Include the name of manufacturer, size, and identification number. Obtain approval from the Engineer before ordering any contractor furnished equipment.
Test Reports (for Cable and Conductor Test, the Local Field Operations Test, and Acceptance Tests.)	Submit within five business days from the completion of a successful test.	Provide after the completion of a successful test. Test Reports are required for each appropriate ATMS device installation, including, but not limited to CCTV, VMS, RWIS, WIM, Traffic Monitoring Detector Loops or other specified detection device, and Fiber Optic Communication Systems. Provide Test Reports in a neatly bound (3-hole) and printed format. Include the following in the Test Reports: 1) All test results (including failed tests) 2) Description of any observed discrepancies 3) Description of required corrective action 4) Estimated time to complete corrective action and re-test 5) Results of any corrective action
Completion Notice	Provide to the Engineer after all devices have successfully passed the Local Field Operations Tests, at least five business days before beginning acceptance tests.	Consists of the certification that all ATMS installations are compliant with all project requirements. Use the Local Field Operations Testing Completion Notification Form obtained from the UDOT website.
Compliance Certificate	Submit within five business days of receipt from the Manufacturer for each site.	Provide an installation compliance certification from the manufacturer on required equipment.

Name	Timeline	Description
Manufacturer's Equipment Documentation	Must be received and accepted before Final Acceptance	Submit all factory issued manuals (per this Section), software, detailed shop drawings, wiring diagrams, certifications, warrantees, instruction sheets, and part lists for all contractor furnished items to the engineer.
As-Built Drawings	Must be received and accepted before Final Acceptance	Refer to Section 01721

B. Factory Issued Manuals
   1. Acceptable factory manuals must contain technical, diagnostic, and maintenance (preventative and troubleshooting) information. Advertising brochures and catalog cuts not accepted.

1.6 WARRANTY

A. Provide warranties of merchantability and fitness for a particular purpose for all furnished equipment, as a whole, each of its components, and the workmanship for the duration of one year from the date of acceptance of the entire project by the Department.

B. Warranties are not required for State-Furnished equipment.

C. Take any corrective action necessary during the Warranty Period, within 72 hours of being notified by the Engineer, to restore any identified deficiency caused by defective workmanship or materials. Repair or replace defective items. Notify the Engineer when corrective action has been completed.

PART 2 PRODUCTS

2.1 WIRING

A. Copper, as specified. National Electrical Code (NEC).

B. Size as specified. American Wire Gauge (AWG).

C. Power Conductors:
   1. Power source conductors, copper, type RHH, USE, RHW.

D. Signal Cable:
   1. Multi-colored cables, as specified.
   2. IMSA 20-1

E. Ground Wire:
   1. Solid, bare, soft-drawn, copper wire, as specified.
   2. NEC 250.1.

F. Splice Sealing: Rural Electrical Association (REA) Bulletin 345-72.
   1. Use approved direct buried, rigid body splice kits with reenterable, gel-filled encapsulant and listed in the USDA Rural Utilities Service (RUS) List of Materials, Informational Bulletin (IP) 344-2, Section 2 - Housings, Splice Cases, etc. Properly size for the cable or wire being spliced.
   2. ASTM D 3005, Type I or II. UL 510.

G. Detector Cables as specified in Section 13591.

PART 3 EXECUTION

3.1 TESTING AND ACCEPTANCE

A. The following tests will be required for all appropriate ATMS devices:
   1. Cable and Conductor Test
   2. Local Field Operations Test
   3. Acceptance Tests
   4. Remote Operations Test where communication is established or available.

B. Notify the Engineer at least five working days before the proposed date and time of all tests.
   1. Obtain UDOT's newest version (at time of bid) of the ATMS Testing Prenotification Form from the UDOT Web site. Refer to http://www.udot.utah.gov/index.php/m=c/tid=719.
   2. The Engineer or the Engineer's Agent must witness the tests.

C. Before any connections are made, perform the Cable and Conductor Test.
   1. Obtain UDOT's newest version of the ATMS Cable and Conductor Test Form from the UDOT Web site. Refer to http://www.udot.utah.gov/index.php/m=c/tid=719.
   2. Before any testing, verify that all cables and conductors are installed as per the manufacturer's plans and recommendations.
   3. Perform all resistance testing after final termination and cable installation, but before the connection of any electronics or field devices.
   4. Replace the cable, then retest new cable as specified above should any cable fail to meet these parameters, or should any testing reveal defects in the cable.

5. Furnish all equipment, appliances, and labor necessary to test the installed cable and conductors.

D. Refer to the appropriate Standard Specification, Supplemental Specification, or Special Provision for device specific Field Operations Test procedures.

E. Refer to Section 13595 for acceptance testing procedures.

3.2 EXISTING FACILITIES

A. Until Final Acceptance, repair any damage to traffic signal equipment, lighting equipment, utilities, and other ATMS items (e.g., conduit, junction boxes, underground traffic signal circuits, cabinets, poles, power sources, or power conductors) caused by contract activities, third party activities, or failure to maintain adequate traffic control or protection of the work.
   1. Request a meeting with the Department and the party with current maintenance responsibility to verify that all existing equipment is in working order at the work site.
   2. Test all loops, cabling, connectors, cabinet operations, etc.
   3. Request, coordinate, and conduct the on-site meeting and provide all labor, materials, test equipment, and test documentation.
   4. Complete all testing as non-destructive.
   5. If no pre-testing is performed, replace or repair any equipment that is not functioning at the time the work is completed at no additional cost to the Department.

B. Locate and mark all utilities before beginning construction.
   1. Contact Blue Stakes and schedule the locating of underground utilities.
   2. Contact any utilities and local government agencies not participating in Blue Stakes locate services.
   3. Determine the exact location of all existing utilities by verifying markings with potholing before commencing work, and be fully responsible for any damage that might result from failure to locate and preserve any underground, surface, and overhead utilities.

C. Contact the Engineer for inspection before restoring cover to any underground facilities repaired during contract execution.

D. Identify any conflicts with existing facilities and contact the Engineer to re-locate any project foundations, trenches, or other items, before further construction work.

E. Notify utilities for verification of working clearances and arrange to have a utility company inspector on site if necessary.

F. Place electrical service requests and orders and coordinate with all other necessary utilities without delaying the project.

G. Identify and resolve any conflicts with existing utilities at locations pre-marked in the field by the Designer.

H. Determine right-of-way boundaries before starting work. Do not proceed on work occurring outside Department right-of-way until the required permits, environmental clearances, and approvals are obtained from all entities.

I. Do not cut any limited access fences.

J. Perform all digging using hand tools or suction if any construction is to take place within two feet of existing facilities.

3.3 LOCATION OF INSTALLED MATERIALS

A. Modify proposed equipment locations to avoid conflict with underground utilities or other obstructions as required. Consult Engineer for approval.

B. Coordinate with the Engineer to have the Engineer or the Engineer's Agent on-site to field locate all new facilities, e.g., cabinet foundations, camera poles, detector poles, and junction boxes.

C. Field locate equipment with the Engineer.
   1. Avoid areas with poor drainage, and place for minimum impact from thrown snow.
   2. Place for maximum accessibility and safety for maintenance personnel.
   3. Satisfy clear zone requirements as defined in the AASHTO Roadside Design Guide (current edition), Chapters 3 and 4.

D. Minimum distance behind concrete barrier or guardrail for all above ground equipment: 3 ft.

3.4 EXCAVATION

A. Do not damage streets, sidewalks, landscaping, or other surrounding features.

B. Do not excavate wider than necessary for the proper construction of the foundations and other equipment.

C. Place the material from the excavation in a position that will minimize obstructions to pedestrian or vehicular traffic and interference with surface drainage.

D. Remove all surplus excavated material and properly dispose of it within 48 hours as directed by the Engineer.

E. Do not cover any underground materials or equipment fill under any circumstances, until inspected and approved by the Engineer.

F. Protect pedestrian and vehicular traffic from all excavations.

3.5 ANCHOR BOLTS

A. Place and hold anchor bolts in proper alignment, position, and height during the placing and vibrating of concrete.

B. Conform to minimum requirements of AASHTO M 314 for anchor bolts. Do not weld anchor bolts to reinforcing steel. Galvanize all nuts, washers, and anchor bolts in accordance with AASHTO M 232.

C. Install anchor bolts in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (current edition) Article 5.17. Retighten all nuts after the structure is fully loaded.

3.6 TRAFFIC CONTROL

A. Refer to Section 01554.

B. Contact each business manager 48 hours before construction impacts any business access. Place business access signs (consistent with the current MUTCD) where access to the business is not readily apparent anytime an access is closed.

3.7 TEMPORARY TRAFFIC SIGNAL TIMING

A. Notify the Engineer and the Traffic Signal Coordination Engineer for approval before implementing temporary changes.

3.8 REUSE OF EXISTING CONDUIT AND JUNCTION BOXES

A. Reuse existing conduit (in-place) and junction boxes when NEC requirements and Department standards for conduit material and depth of cover can be met as specified by the Engineer.

3.9 ABANDON ATMS FACILITIES IN PLACE

A. Do not remove existing pull wire from conduit that is to be abandoned in place.

B. Obliterate all existing foundations left in place to a depth of at least 6 inches below the existing surface. Properly dispose of removed concrete.

C. Remove all conductors, except pull wires, being taken out of service. Cut the ends even with the end of pipe if abandoning in place.

3.10 REMOVE AND SALVAGE ATMS EQUIPMENT

A. Remove existing equipment as specified.
   1. Maintain the integrity of the equipment during removal and transport.
      a. Contact the Engineer 48 hours before removal to arrange for Department inspection to verify Equipment condition, otherwise the equipment will be assumed functional and undamaged.
      b. Replace damaged equipment at no additional cost to the Department.
   2. Return equipment to the appropriate Department facility as indicated by the Engineer.

B. All salvageable poles and cabinets:
   1. Contact the Engineer at least 48 hours before removal.
   2. Return to appropriate Department facility.

C. Cable and wiring:
   1. Spool all cable to be salvaged neatly onto appropriately sized spools.
   2. Avoid cutting long cables whenever possible.
   3. Cut cables only at splice locations or as directed by the Engineer.
   4. Cap wires as described in this Section, article 3.13.
   5. Do not exceed the minimum bending radius and the maximum pulling tension recommended by the manufacturer's specifications at any time.

3.11 ELECTRICAL

A. Perform all work in accordance with the National Electrical Code (NEC), National Electrical Safety Code (NESC), and International Building Code (IBC).

3.12 INSTALL WIRING

A. Conductors:
   1. Clean and dry the inside of the conduit before installing conductors.
   2. Install grounding conductor in all power circuit conduits (Refer to NEC, Article 250.1).
   3. Use NEC approved lubricants when pulling conductors in conduit.
   4. Tape and seal the ends of unused conductors and label them as spares.
   5. Use conductors that are color coded as specified in IMSA and comply with NEC, Article 310.

B. Ground wire:
   1. Ground wire in non-metallic conduit must run continuously and be grounded at each junction box, except in those conduits used solely for interconnect and detector circuits.
   2. Bond the ground wire to the ground rod in each junction box.

C. Neatly arrange and support wiring within cabinets, junction boxes, fixtures, etc.

D. Wire splicing:
   1. Splice wires only in detection circuits where the wire type changes in the junction boxes.
   2. Mechanically secure and solder, individually insulate, and water seal all splices.

E. Do not exceed the minimum bending radius or the maximum pulling tension recommended by the manufacturer's specifications at any time.

F. Keep cable ends sealed at all times during installation using an approved cable end cap. Do not use tape to seal the cable end. Keep cable end sealed until connectors are installed.

3.13 MAINTENANCE OR REPAIR

A. Repair, replace, maintain and operate all installed ATMS devices until Final Acceptance. Includes but is not limited to:
   1. Replacement of damaged cabling.
   2. Repair or replacement of damaged conduit and junction boxes.
   3. Repair or replacement of Department and Contractor furnished items.

B. Repair installation or replace equipment due to any damage as specified in Section 00725.

C. Emergency Maintenance: Until Final Acceptance of the ATMS device, provide emergency maintenance on a seven-day per week, twenty-four hour basis. Respond to the dispatcher within 15 minutes when called or paged by the dispatcher. Provide contacts and telephone numbers to the Engineer for the emergency service.

D. Limit emergency repair response (one hour maximum) to problems of a public safety nature, such as exposed wires or knockdowns.

E. Non-emergency repairs: Initiate other non-emergency repairs within 24 hours of notice.

F. Failure to provide adequate routine or emergency repairs will result in the Department itself making the necessary repairs, or through a separate contractor. The Contractor will be charged accordingly.

END OF SECTION